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ABSTRACT

The facts and ideas of subject matter are of little or no value unless such facts and ideas are used to promote thoughtful discourse. Those who teach with this idea in mind can be said to be thinking-skills centered or procognitive; those who teach without this idea in mind can be termed content-centered or procontent. The procognitive viewpoint is based on seven assumptions: (1) all subject matter can be taught procognitively; (2) subject matter and critical thinking skills can be taught at the same time; (3) all subject matter serves some purpose; (4) it is a teacher's responsibility to encourage discourse (thinking) by providing examples that arrange subject matter to show its purpose by revealing the relationships and interconnections which exist in all subject matter; (5) it is the learner's responsibility to understand and apply such example arrangements to new subject matter; (6) students must be actively encouraged to present subject matter in a procognitive manner; and (7) all modes of educational technology can be delivered procognitively. These assumptions derive from an integrated view of subject matter, critical thinking, teaching, educational technology, and learning. In turn, these five major procognitive concerns form a three-part model which consists of the resource, the process, and the result. The application of procognitive methodology is illustrated using this three-part model to plan a discussion of the topic, how to do well in college. A list of nine references is provided. (JB)

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PROCOGNITIVE INDIVIDUALIZED INSTRUCTION

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Introduction

The facts and ideas of subject matter (any subject matter) are of little or no value unless such facts and ideas are used to promote thoughtful discourse. Those who teach with this idea in mind can be said to be thinking skills centered or procognitive. Those who teach without this idea in mind can be said to be content-centered or procontent.

Procognitve teaching presupposes a conscious concern for arranging subject matter to show its purpose. In manifesting this concern, students are necessarily drawn into thinking patterns which minimize memorization (simply knowing something) and maximize individual understanding, analysis, and evaluation.

Procognitive Assumptions

The procognitive viewpoint is based on the following assumptions:

1. All subject matter can be taught procognitively
2. Subject matter and critical thinking can be taught at the same time.
3. All subject matter serves some purpose. If it did not it presumably would not be a part of the curriculum.
4. It is a teacher's responsibility to encourage discourse (thinking) by providing examples which arrange subject matter to show its purpose; by revealing the relationships and interconnections which exist in all subject matter.
5. It is the learner's responsibility to understand and apply such example arrangements to new subject matter.
6. Students must be actively encouraged to present subject matter in a procognitve manner.
7. All modes of educational technology (e.g. classroom lecture, textbooks, computer assisted instruction) can be delivered procognitively.

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These assumptions derive from an integrated view of subject matter, critical thinking, teaching, educational technology, and learning. This view is elaborated as follows:

Subject Matter: The procontent or traditional notion of subject matter is that it is a given body of knowledge, the facts and ideas associated with a specific course of study, or the material of a lesson plan or of a textbook. A procognitive view is that subject matter comprises the facts and ideas associated with the development of a situation which is end-directed. Such situations having a purpose should be created by teachers. In this manner subject matter is used in connection with problem solving; it serves a purpose regarding future learning.

All subject matter has intelllectual value to the extent that intentionally performed operations are consciously connected to the results achieved.

Thinking: The essence of procognitive methodology is the making of connections. Conceptions and statements should follow from and lead to others. Procognitve methodology views critical thinking as the determination of the means-ends-consequence relationships that exist in all subject matter and problem solving activities; in fact in all intelligent activity.

An advantage of this approach is that it encompasses subordinate thinking skills and thus becomes a foundation concept for the teaching and learning of all thinking skills.

Teaching: Procognitive methodology does not begin with ready-made (e.g. a textbook or software package) subject matter but starts with an actual empircal situation capable of initiating interest and thought. This avoids isolating subject matter from end-directed activities. It therefore becomes the responsibility of teachers to arrange subject matter to show its purpose; to show the means-ends-consequence relationships that exist in all subject matter.

The major aim of procognitive teachng is to have students make their own observations and apply their own means-ends-consequence thinking when learning and studying subject matter.

Learning: Although experiment and inference are inate and manifest at an early age, the habit of critical thinking must be learned. Otherwise empiricism will rule. Learning should be an activity that ends in understanding, not memorization. It should be an activity whose ends are established by thought.

In procognitive methodology the responsibility for thinking activity lies with the student, the instructor is a guide and director. By presenting subject matter in a means-ends-consequence fashion, students will be lead to develop the habit of critical thinking.

Educational Technology: Textbooks, workbooks, films, filmstrips, computer software and all other packaged delivery of subject matter, represent the thought, presumably, of experts. But the standard approach is to prepare such materials in a procontent (topical) manner. Such presentations do not arrange subject

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matter to show its purpose. Memorization is encouraged. Therefore students must be helped in finding procognitve approaches to subject matter.

Procognive Model

Based on the foregoing, the five major procognitive concerns can be placed within the framework shown in Figure 1:

Figure 1

Resource		Process		Result
o Subject Matter	----->	o Critical Thinking o Teaching (as supported by educational technology)	----->	o Learning

Learning is placed in the result portion because it is the end or outcome that education seeks to achieve. Subject matter is placed in the resource portion of the model because it provides the ingredients or starting point for learning. Since learning is achieved through the learner's own thought processes as assisted by teaching, critical thinking and teaching are placed in the process portion. Based on this model the following procognitive methodology emerges.

The Elements of Procognitive Methodology

1. Since subject matter serves some purpose (i.e some end), it is up to the teacher to think about the subject matter so that its purposes are revealed. In very simple terms this means: why do we care about the subject matter?

2. Once purposes are revealed, the means (resources and activities) that serve the purpose(s) identified.

3. Once the teacher has arranged the means and ends, they are presented to the students as such. It is advisable to simplify such presentations--but the means-end arrangement must be preserved since it is this arrangement that contains the potential to assist students in the development of thinking skills.

4. Students should be given the opportunity to operate procognitively (i.e create such arrangements) on their own.

Application of Procognitive Methodology: An Example

Since subject matter understanding resides in discovering means-ends-consequence relationships, the teacher must determine

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not only which particular subject matter ends and consequences are to be sought but also the associated means. The identified objective will then set the problematic situation for inquiry.

To provide a simple example, suppose you wanted to discuss how to do well in a college course. To simply plan on topically presenting the elements is to miss the opportunity to establish procognitve means-consequence-ends relationships. Instructor introspection regarding the subject matter is necessary. Such introspection must give rise to simple means-ends-consequence examples. For example, the instructor might create an image (picture) which places college study in a relationship such as that shown in Figure 2.

Figure 2
Placing Study Fundamentals in a Procognitive Relationship

Resource		Process		Result
o Classroom	---->	o Attend class	----->	o Learning of course material and increased chance of a good mark
o Teacher		o Take good notes		
o Desire to learn		o Ask questions		
o Time		o Study notes and textbook		
o Notebook		o Take exams		
o Textbook				

This figure illustrates that according to procognitve methodology one cannot simply decide to discuss subject matter without first deciding which ends and consequences are to be promoted by what means. Such preparation requires that the instructor first achieve an understanding of the subject matter and then place it in a procognitive format. Otherwise, there is danger of simply "covering the subject matter", to the detriment of promoting thinking skills.

In attempting to explicate subject matter, the instructor (and eventually the student with whom these illustrations will be shared) seeks out the fundamental relationships inherent in all subject matter. In essence the subject matter is turned back on itself to reveal its underlying relationships and interconnections; process and product merge, and thinking is encouraged.

Instructors should not assume that their students' subject matter background matches their own. The facts, ideas, and concepts discussed must be presented at a level consistent with the students' experience and subject matter maturity level. As straighforward as Figures 1 through 2 may appear to the instructor (after having thought them through), the student has not as yet had the equivalent experience. The instructor should first provide examples of procognitive relationships by reference to

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everyday life experiences.

Given their procontent orientation, texts and other educational materials should be used only as tools for summarizing ans reviewing classroom work. The text material should not be used in place of an inquiry-based subject matter procognitive subject matter analysis.

Conclusion

Procognitive methodology doesn't merely describe or present subject matter, as is the case with procontent approaches to teaching. Procognitive methodology--of which the framework described herein is but an example--transforms subject matter.

In doing so it has the potential to accomplish two of the goals that teachers at every level hold dear: a) the ability to help students transform themselves from unquestioning acceptors of course content to thoughtful inquirers of subject matter, and b) recognition as professionals, on a level with the other professionals, whose efforts can and do make a difference.

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